Introduction to IndianaMap Resources and LiDAR

Phil Worrall, Executive Director Indiana Geographic Information Council (IGIC)

www.igic.org & www.indianamap.org

Introduction to IndianaMap Resources and LiDAR

The IndianaMap is…

Indiana's largest publicly available collection of Geographic Information System (GIS) Data.

Indiana GEOGRAPHIC INFORMATION COUNCIL

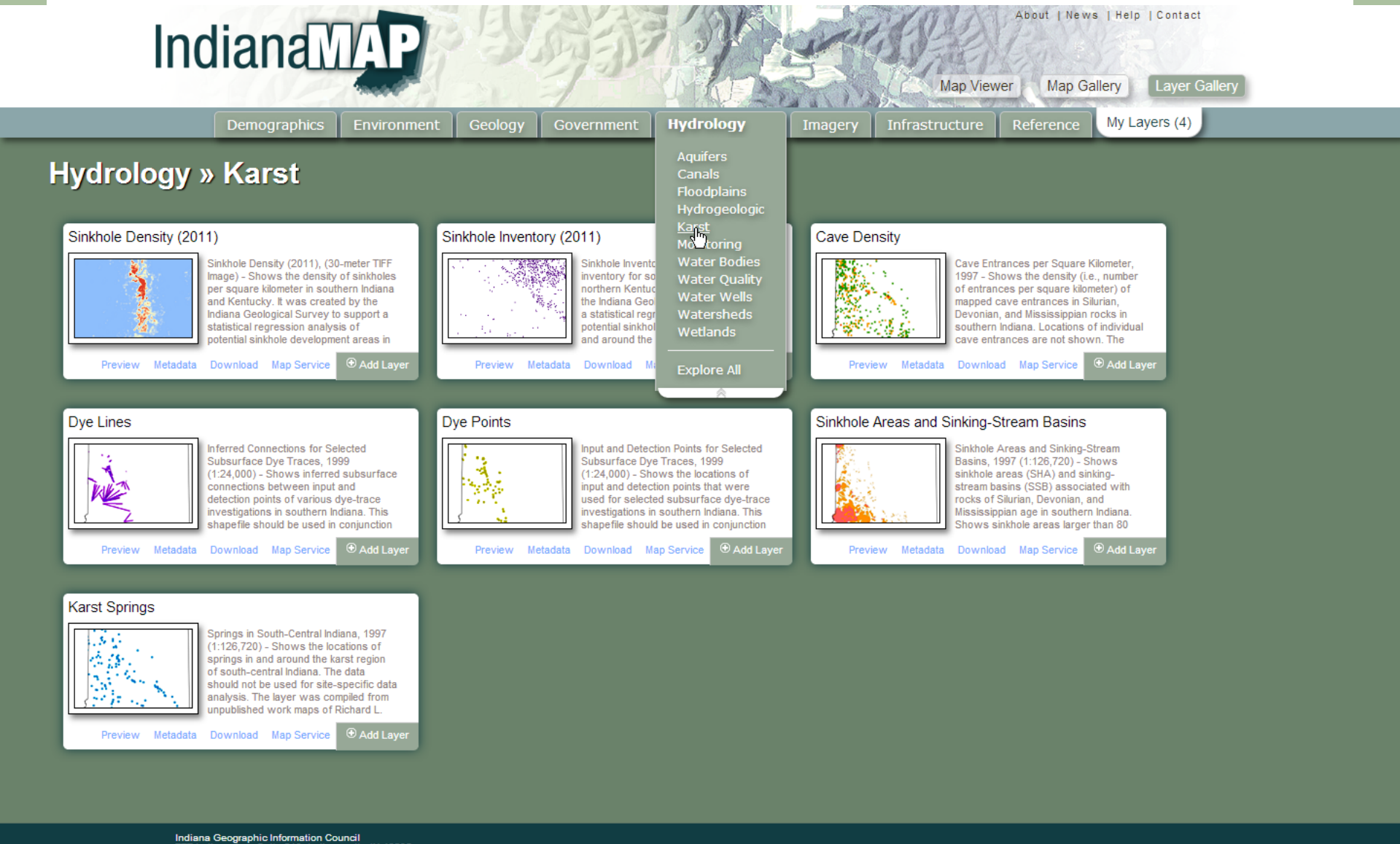
IndianaMap.org Web Site

Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

Over 260 Layers on the IndianaMap from over 25 Data Contributors

Indiana Department of Transportation (INDOT) – 14 layers
Indiana Department of Natural Resources (IDNR) – 9 layers
Indiana Department of Environmental Management (IDEM) – 22 layers
Indiana Office of Technology (IOT) – Geographic Information Office (GIO) – 5 layers
Indiana Geological Survey (IGS) – 63 layers
Indiana Department of Commerce – 4 layers
Indianapolis Mapping and Geographic Infrastructure System (IMAGIS) – 1 layer
Indiana Geographic Information Council (IGIC) – 3 layers
Indiana Business Research Center (IBRC) – 2 layers
Indiana Election Division – 2 layers
Indiana Utility Regulatory Commission (IURC) – 1 layer
Federal Emergency Management Agency (FEMA) – 4 layers
National Oceanic and Atmospheric Administration (NOAA) – 2 layers
National Park Service (NPS) – 2 layers
National Resource Commission (NRC) – 1 layer
U.S. Census Bureau (USCB) – 23 layers
U.S. Environmental Protection Agency (EPA) – 5 layers
U.S. Geological Survey (USGS) – 23 layers
U.S. Department of Agriculture (USDA) – 15 layers
Bureau of Transportation Statistics (BTS) – 6 layers
U.S. Fish and Wildlife Service (USFWS) – 4 layers
U.S. Forest Service (USFS) – 2 layers
Federal Communications Commission (FCC) – 1 layer
Bernardin, Lochmueller, and Associates, Inc. – 4 layers
Environmental Systems Research Incorporated (ESRI) – 1 layer

IndianaMap Viewer – Layer Gallery



Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

IndianaMap Viewer – Layer Gallery

KARST_DYE_LINES_IN: Inferred Connections for Selected Subsurface Dye Traces in Southern Indiana (Indiana Geological Survey, 1:24,000, Line Shapefile)

Metadata also available as - [Parseable text]

Metadata:

Identification_Information:

Citation:

Citation_Information:

Originator: Indiana Geological Survey
Publication_Date: 20020717
Title:
KARST_DYE_LINES_IN: Inferred Connections for Selected Subsurface Dye Traces in Southern Indiana (Indiana Geological Survey, 1:24,000, Line Shapefile)
Geospatial_Data_Presentation_Form: Vector digital data
Publication_Information:

Publication_Place: Bloomington, Indiana
Publisher: Indiana Geological Survey

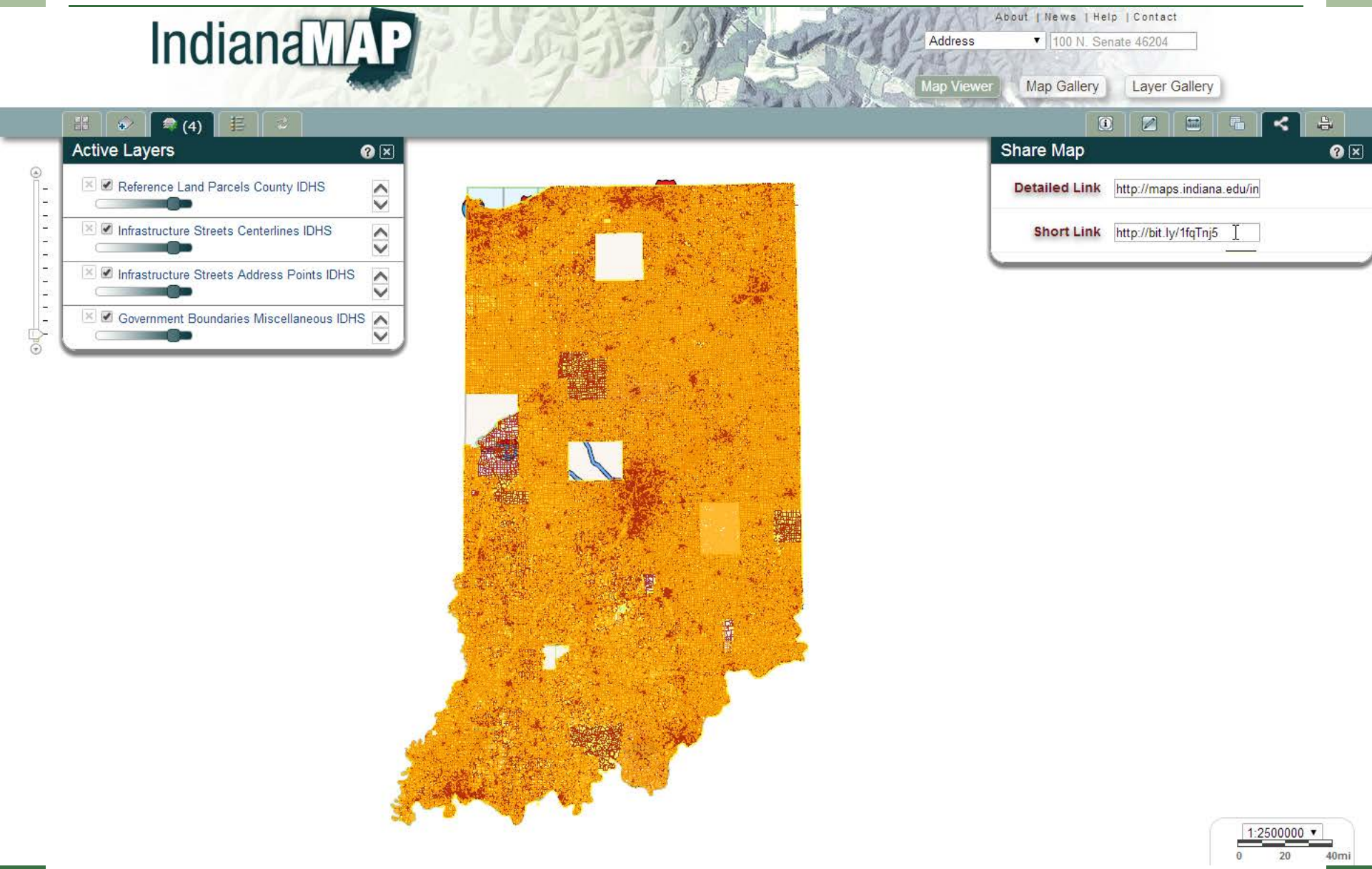
Online_Linkage: <http://igs.indiana.edu/arcims/statewide/download.html>
Other_Citation_Details:
A predecessor of this shapefile (a coverage named DYE_LINE) was used in the publication of the following map: Frushour, S.S., Harper, D., and Dintaman, C., 2000, Selected subsurface dye traces in south-central Indiana, Indiana Geological Survey, Miscellaneous Map 66.

Description:

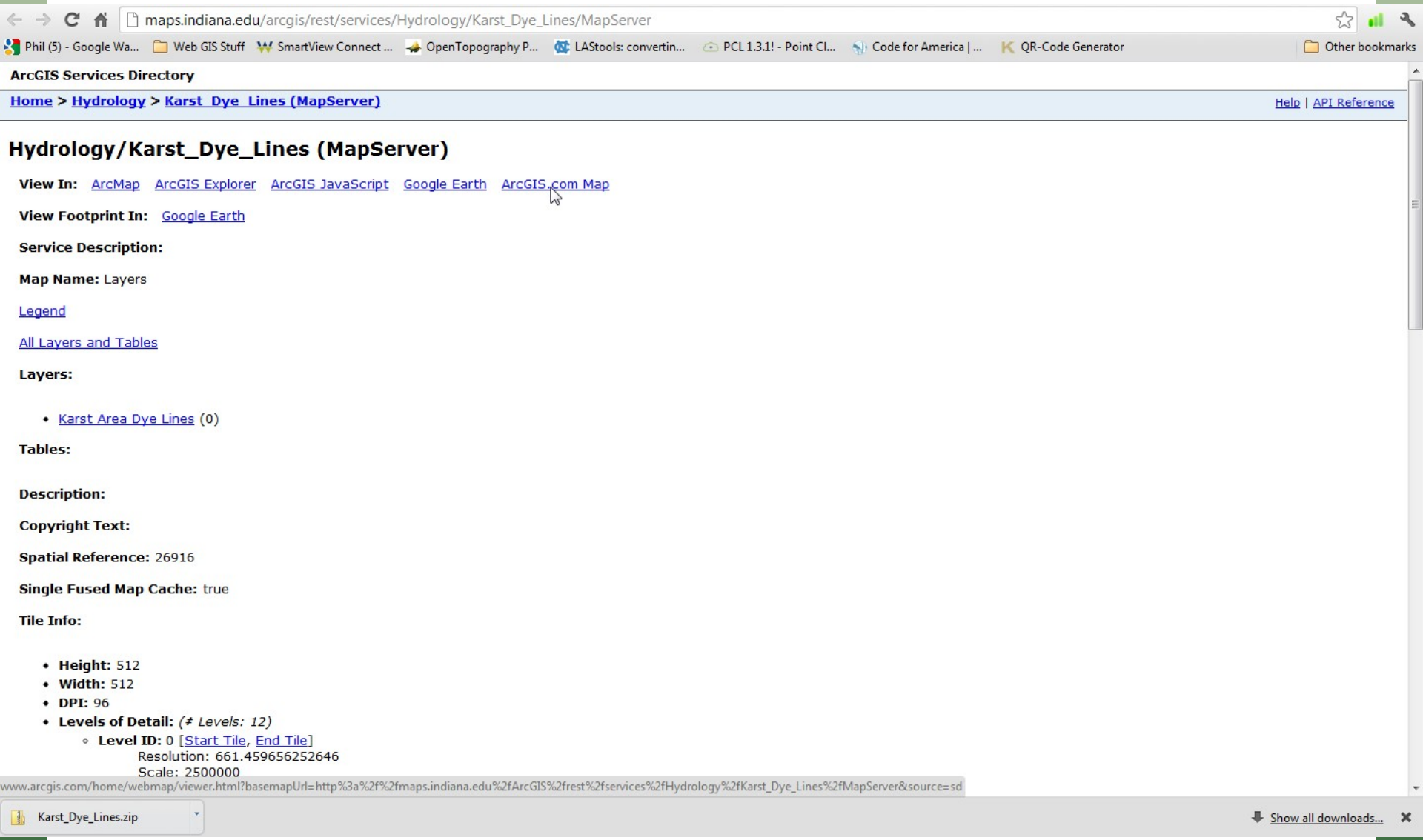
Abstract:
KARST_DYE_LINES_IN is a line shapefile that shows inferred subsurface connections between input and detection points of various dye-trace investigations in southern Indiana. This shapefile should be used in conjunction with an associated shapefile named KARST_DYE_PTS_IN, which shows input, output, and intermediate dye-trace points.
Purpose:
KARST_DYE_LINES_IN was derived from a coverage named DYE_LINE. The purpose of DYE_LINE was to compile unpublished work maps of Samuel S. Frushour (Indiana Geological Survey) and to bring

IndianaMap Viewer

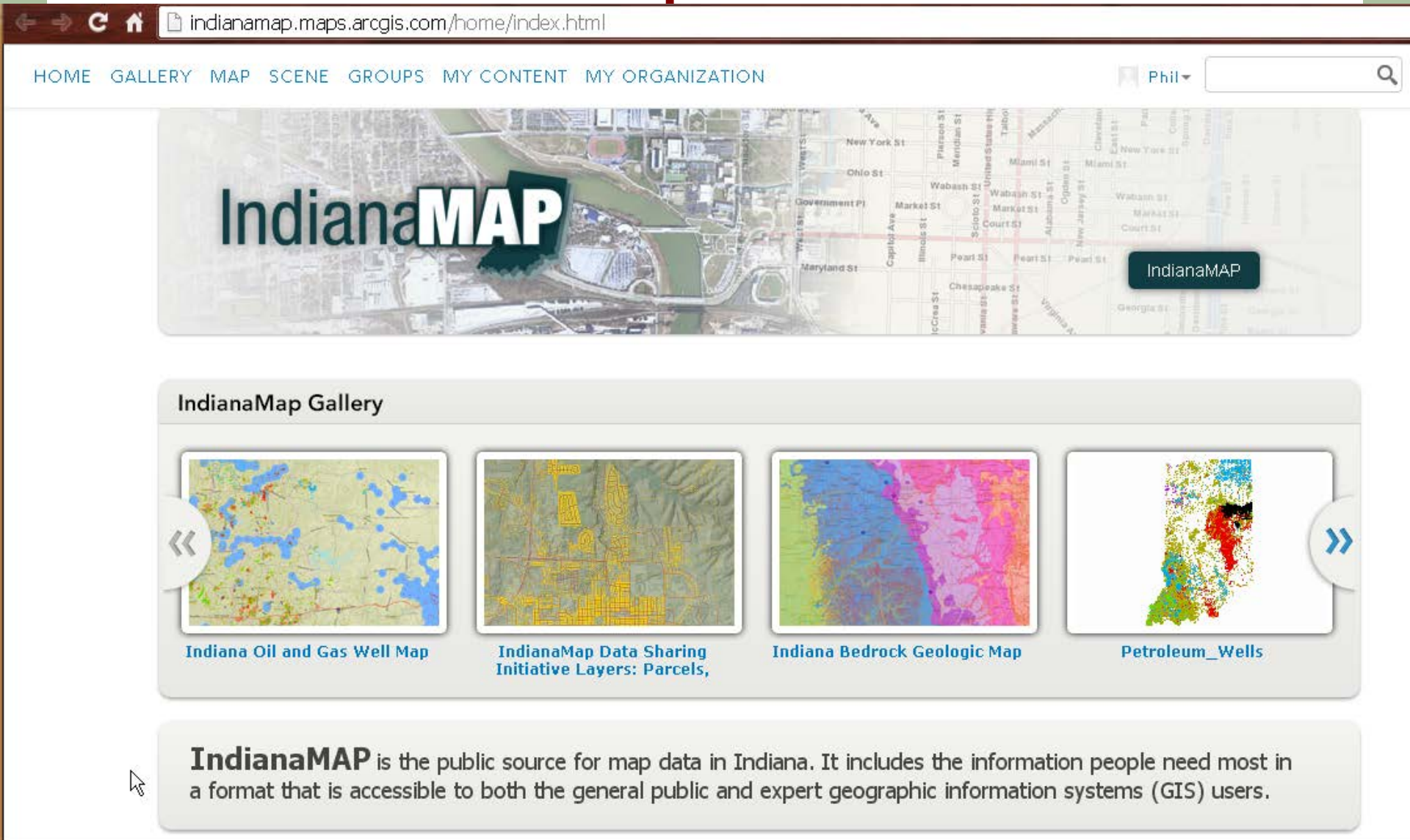
http://maps.indiana.edu



IndianaMap Viewer – Layer Gallery

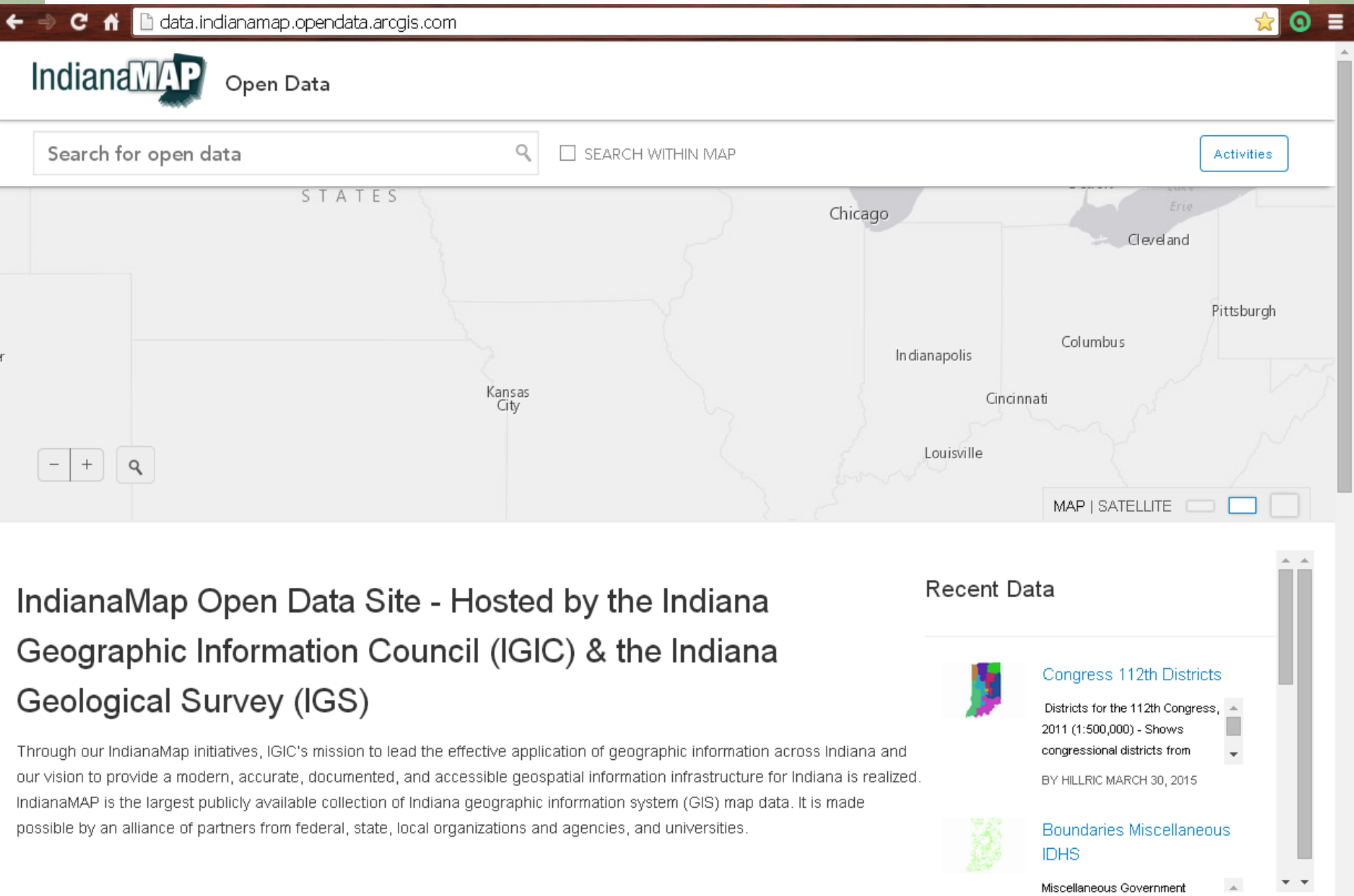


IndianaMap Services on ArcGIS.com



Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

IndianaMap Open Data Portal (ArcGIS.com)



The IndianaMap Spatial Data Portal

Coordination of Indiana GIS through dissemination of data and data products, education and outreach, adoption of standards, and building partnerships

IndianaMap.org Web Site

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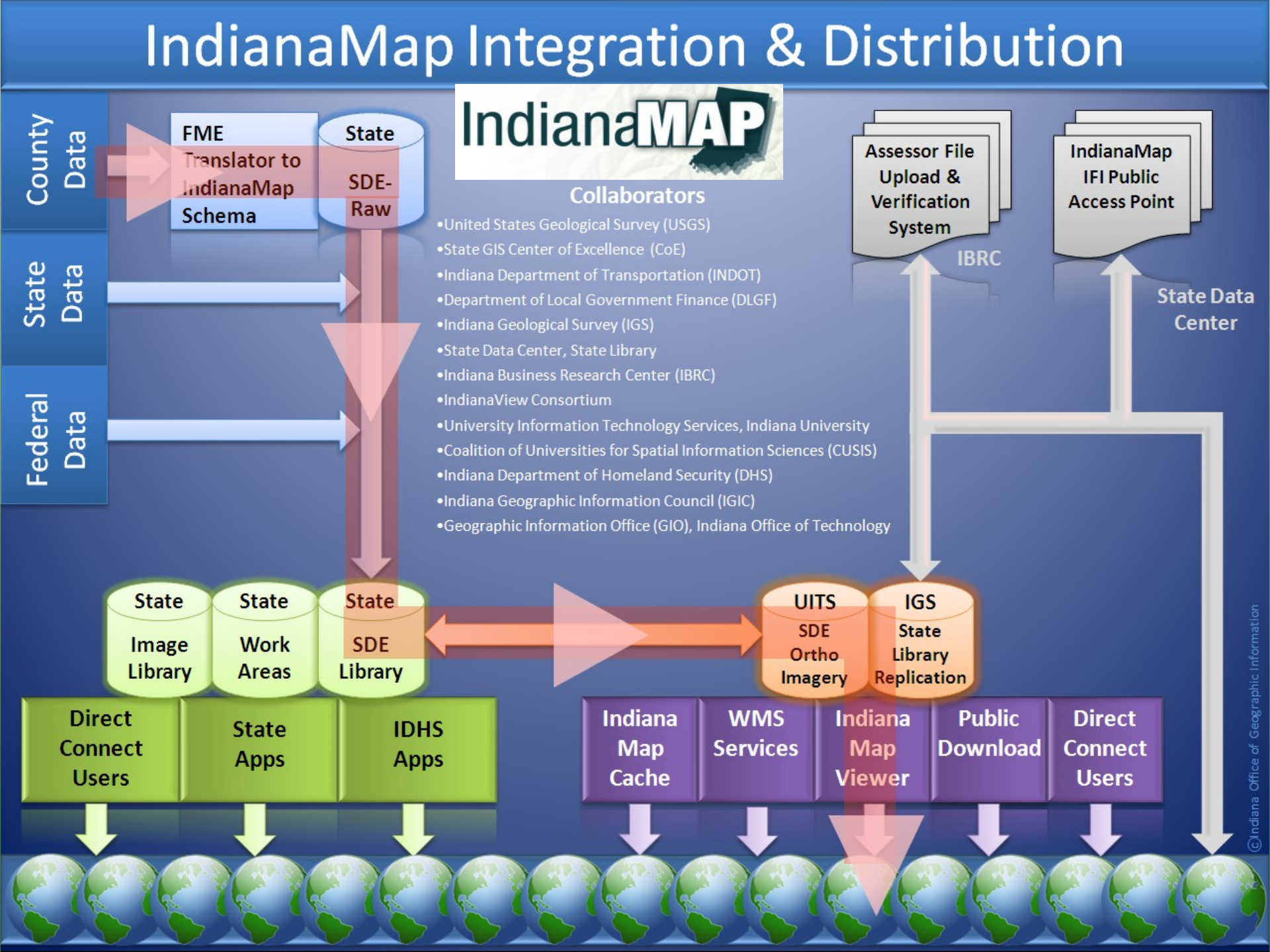
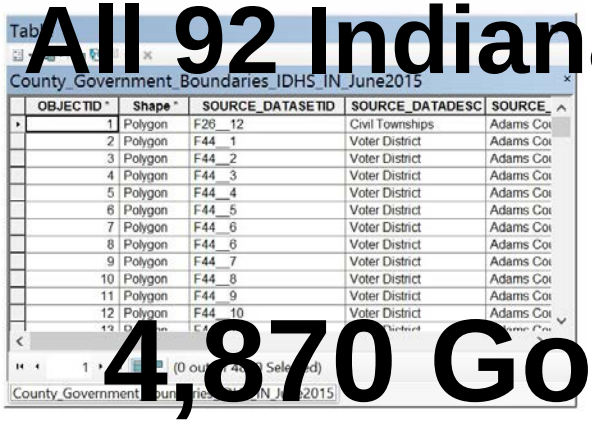
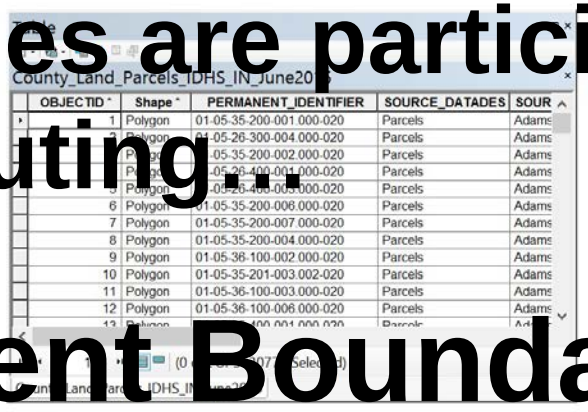
IndianaMap Integration & Distribution



The IndianaMap
County Data Sharing Initiative

All 92 Indiana Counties are participating, contributing…

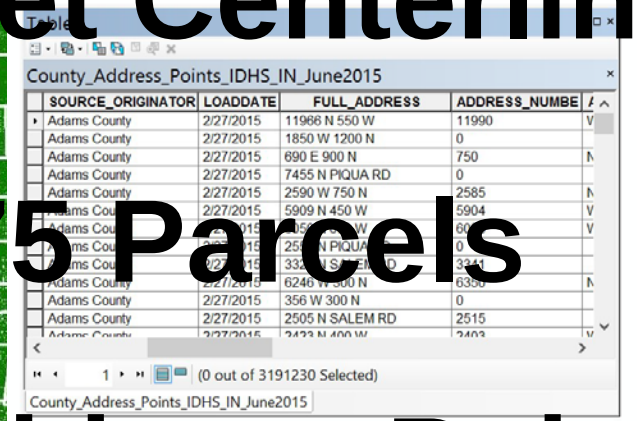




4,870 Government Boundaries

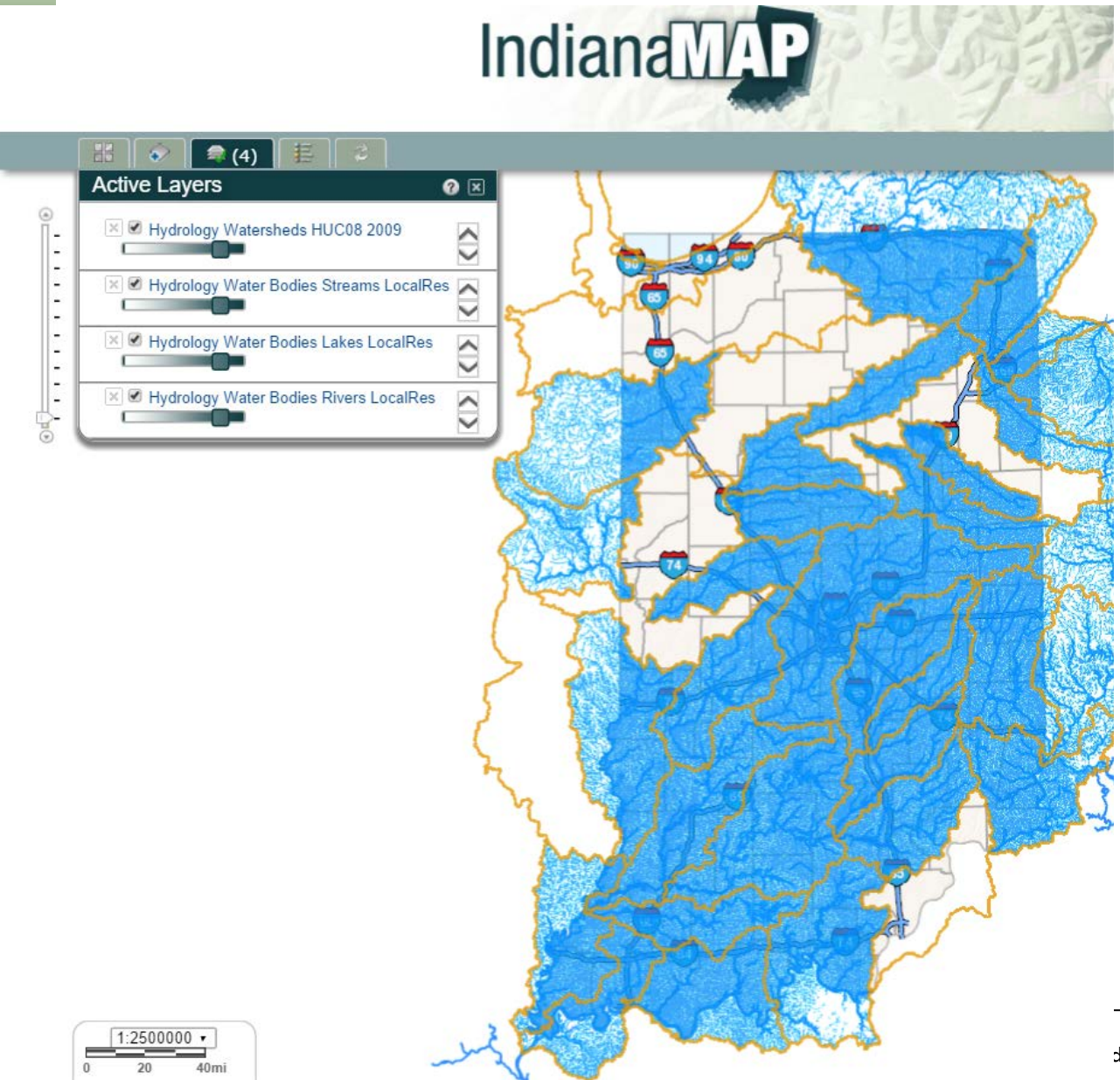
603,132 Street Centerlines

3,630,775 Parcels



3,191,230 Address Points

Improving Indiana's NHD

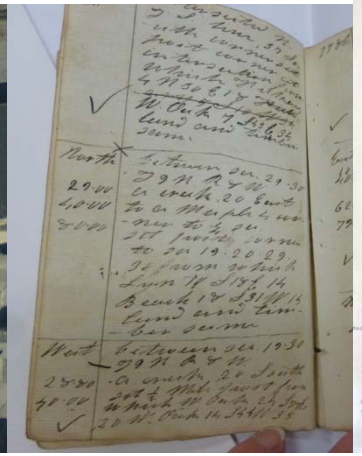


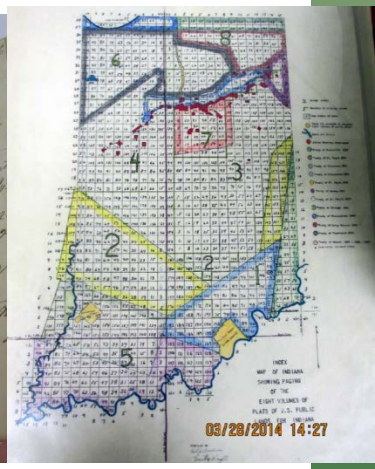
IndianaMap
http://bit.ly/1pqurk4

SwipeMap
http://arcg.is/1HHmzQa

Remembering our Past!

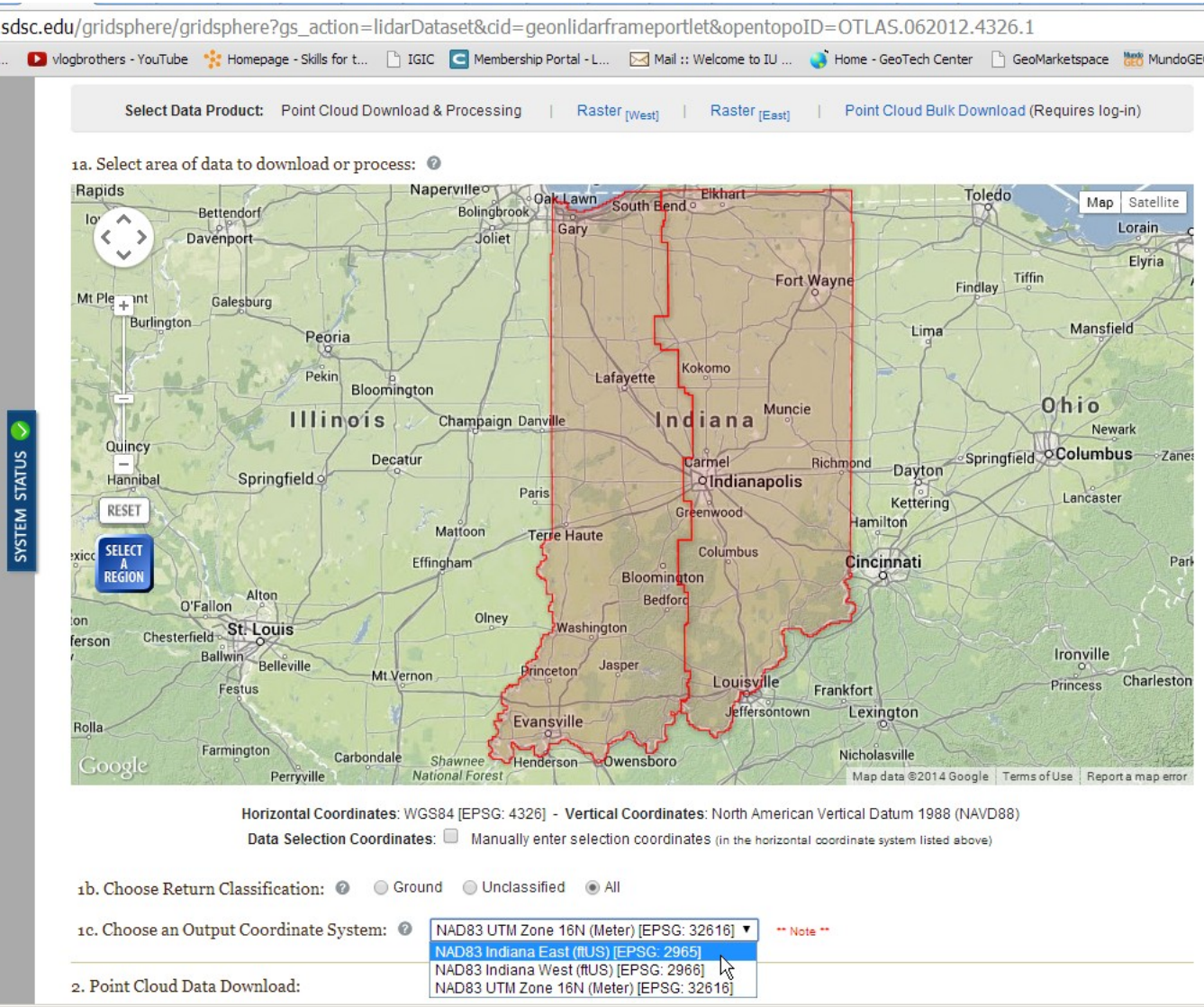
- Preserving Indiana Historic Imagery Archives [INDOT]
- Preserving Historic Sanborn Maps
- Preserving Indiana's Original Surveying Records - Government Land Records Office [GLO] Records





http://www.igic.org/category/committees/education-outreach/

The Indiana OpenTopography Server



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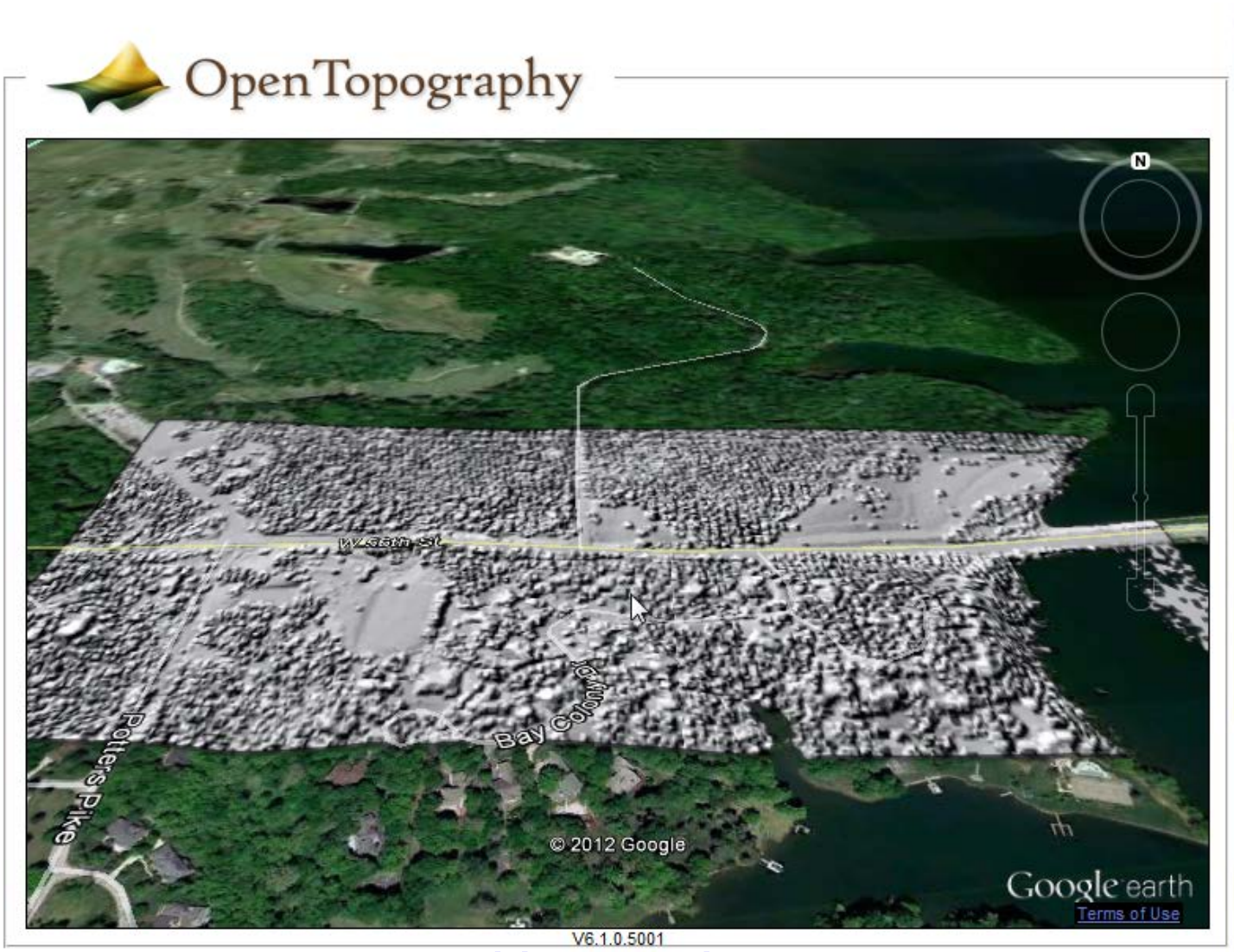
The Open Topography Server for Indiana



http://bit.ly/Xwy86P

Introduction to IndianaMap Resources and LiDAR

Introduction to LiDAR

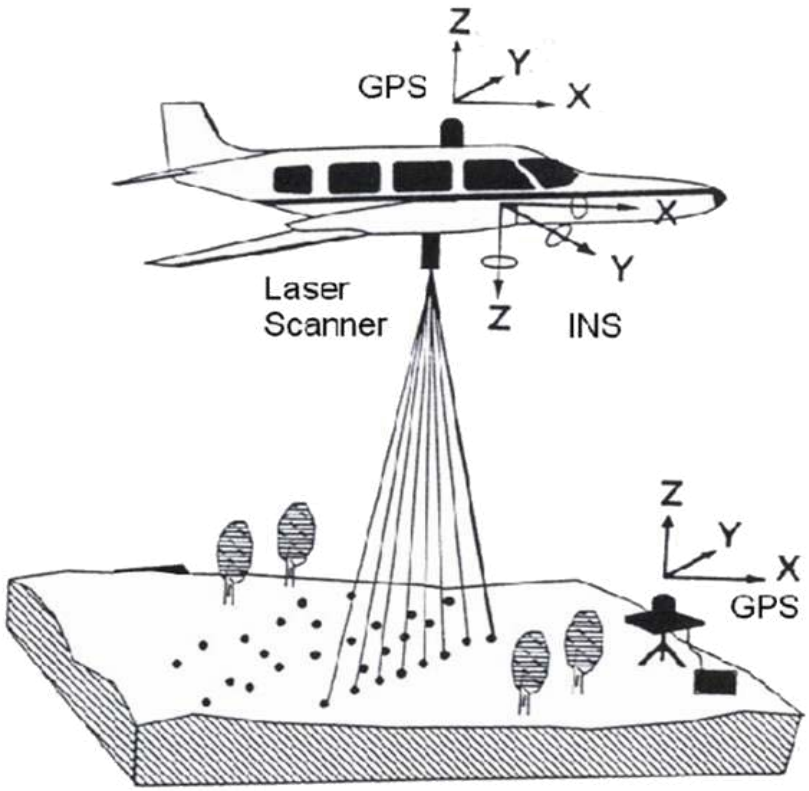
(Light Detection and Ranging)

Indiana GEOGRAPHIC INFORMATION COUNCIL

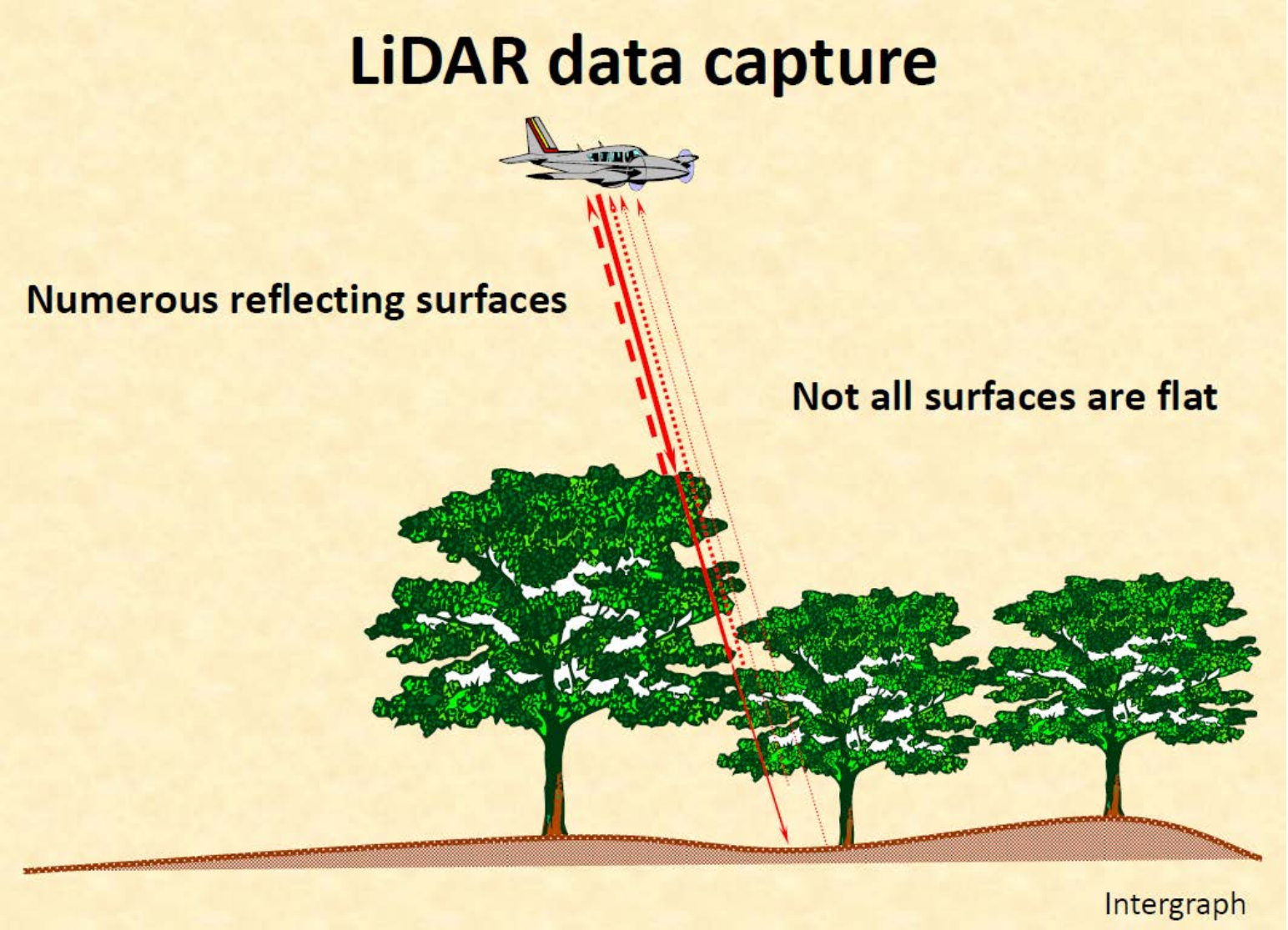
Introduction to LiDAR

LiDAR acquisition involves precise timing and calibration of several instruments.

- ABGPS data is differentially corrected to solve for final position
- IMU data is used to determine sensor orientation
- Laser scanner sub-systems record range and direction of ground points.
- All of these instruments must be properly calibrated to ensure quality point cloud data is obtained

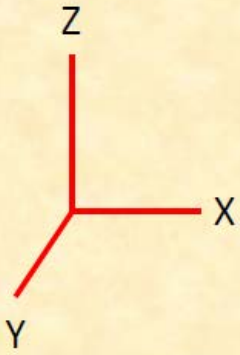


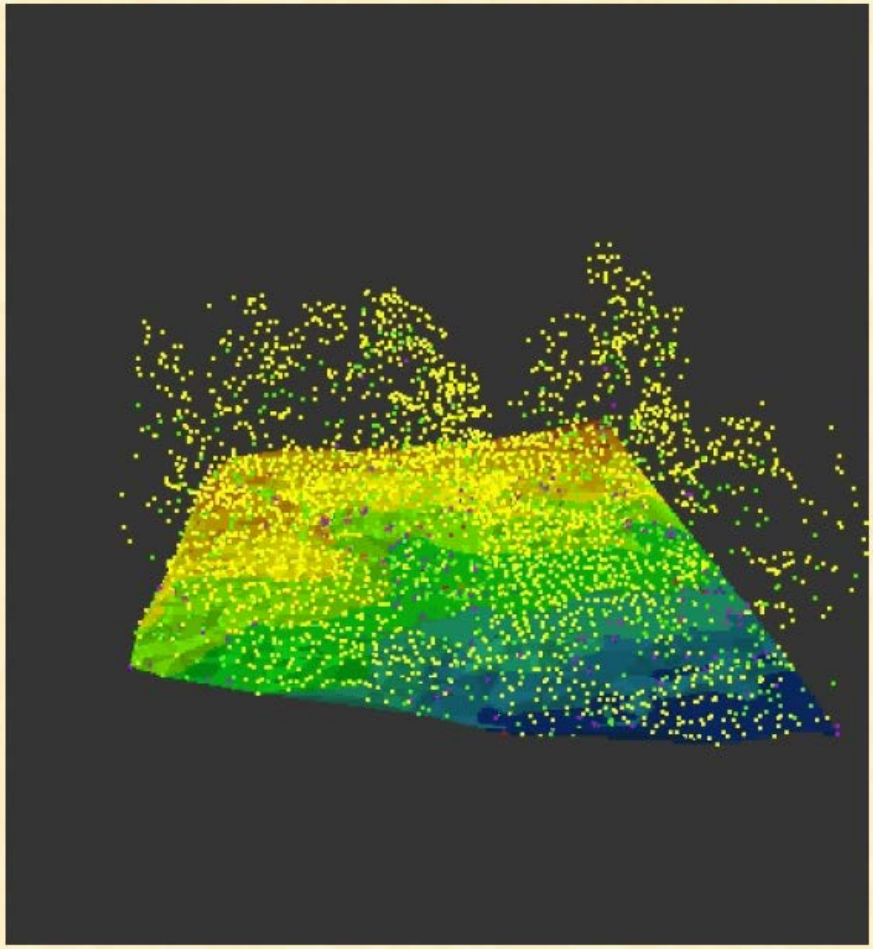
Introduction to LiDAR



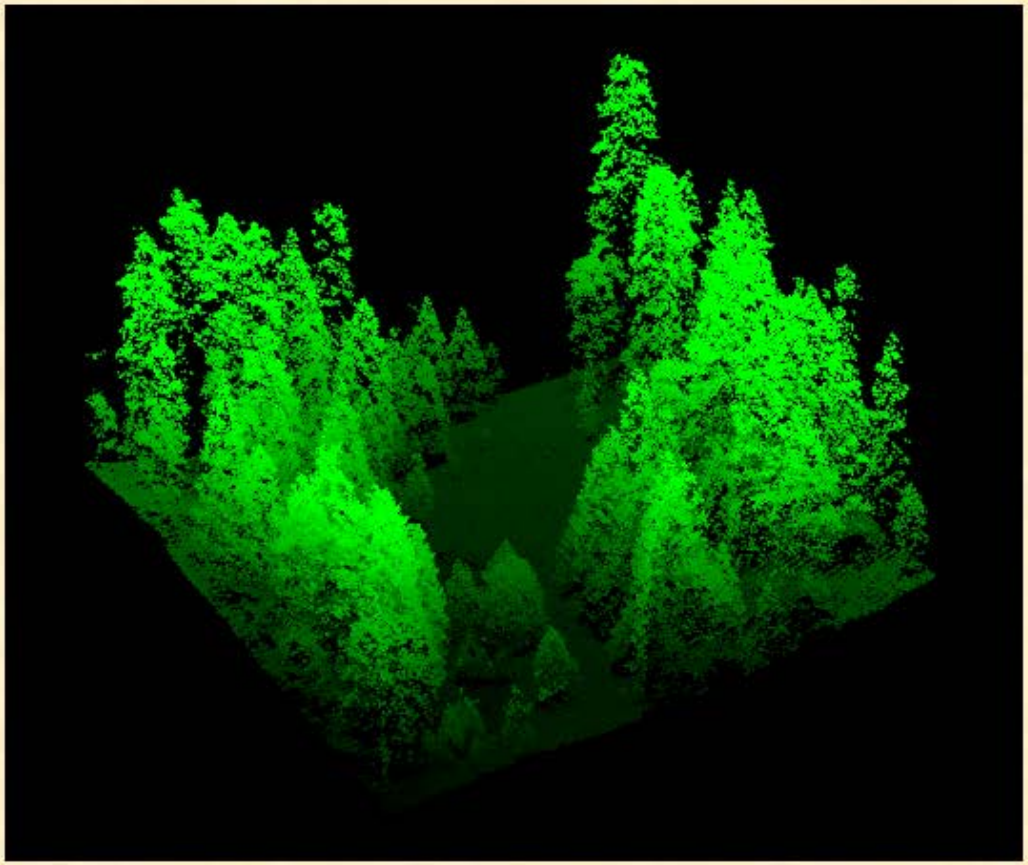
Introduction to LiDAR

Point cloud = a collection of points with x, y, and z coordinates

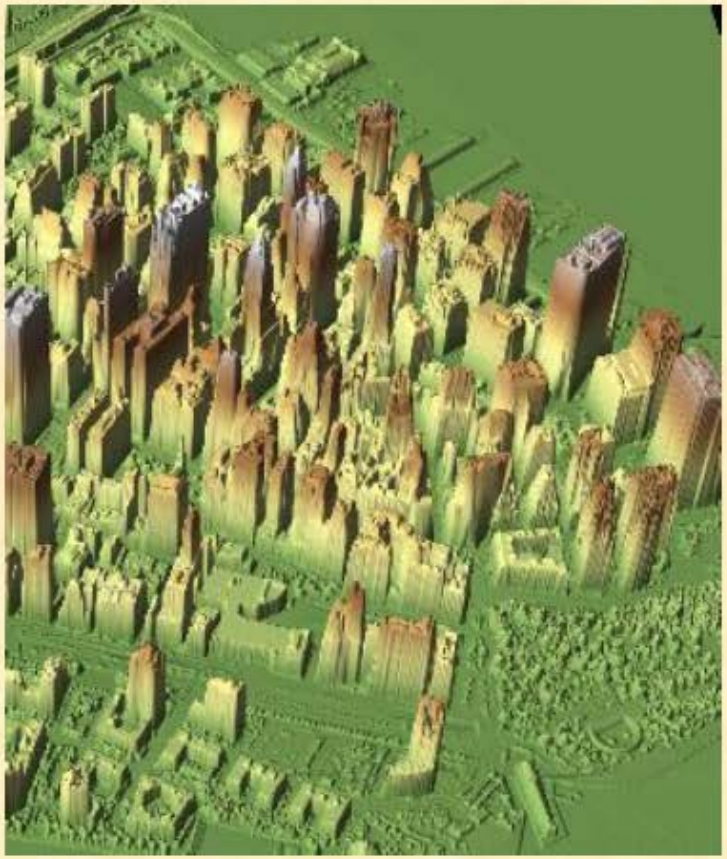




Introduction to LiDAR



UC Davis



Introduction to LiDAR

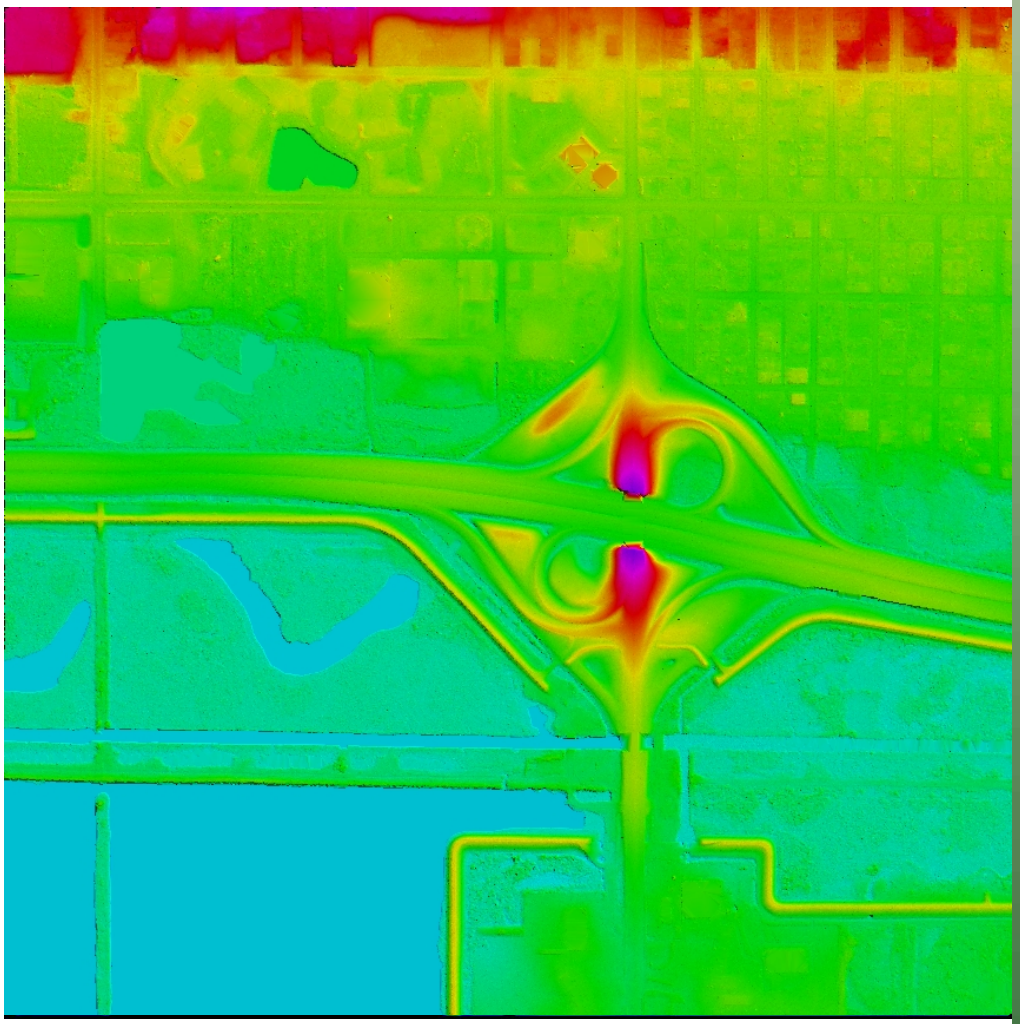
What is a Digital Elevation Model?

- Digital Elevation Models are regularly gridded (continuous) elevations interpolated from discrete mass points and break-lines.
- Digital Elevation Models are commonly derived from airborne LiDAR data.

Introduction to LiDAR

Bare-earth DEM generation from LiDAR data requires multiple processing steps.

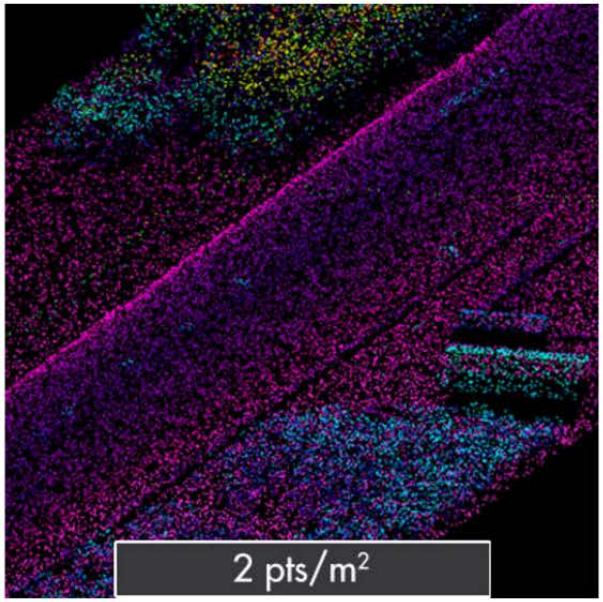
- The LiDAR point cloud must be filtered to identify ground and non-ground points.
- The bare-earth points do not properly model hydrologic features.
- Break-lines are added to develop a final DEM that can be used for hydrologic modeling.

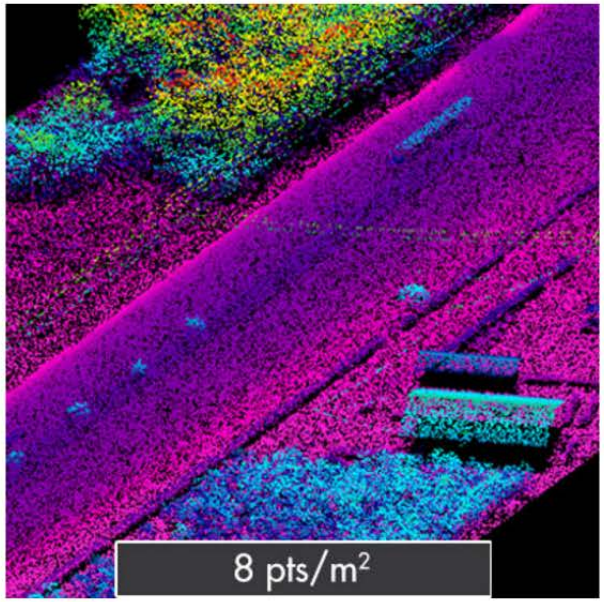


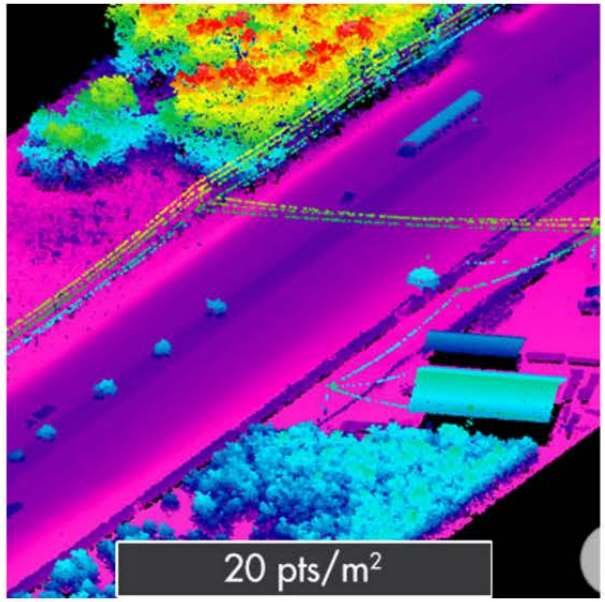
Emerging 3D Technologies

Single Photon Lidar – Sigma Space (Hexagon)

Geiger Mode Lidar – HARRIS Corp., Intelliearth

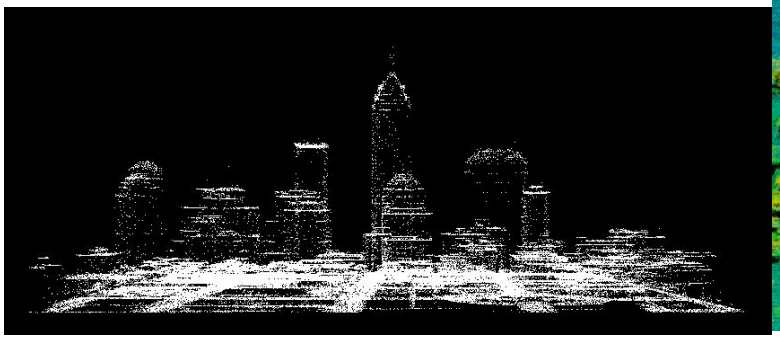


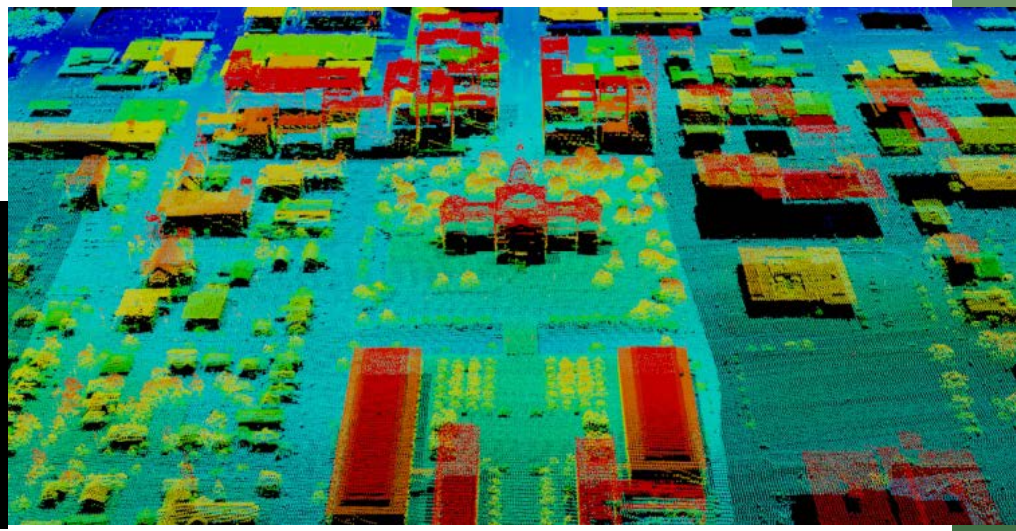




Indiana's current LiDAR holdings

- Filtered raw LiDAR data (point clouds) in LAS v1.2 format
- LiDAR bare earth data, first, last return data, intensity in LAS v1.2 format
- Hydro Breaklines in ESRI format
- Hydro Flattened DEM data delivered in ERDAS Imagine .IMG
- 5,000 X 5,000 tiles



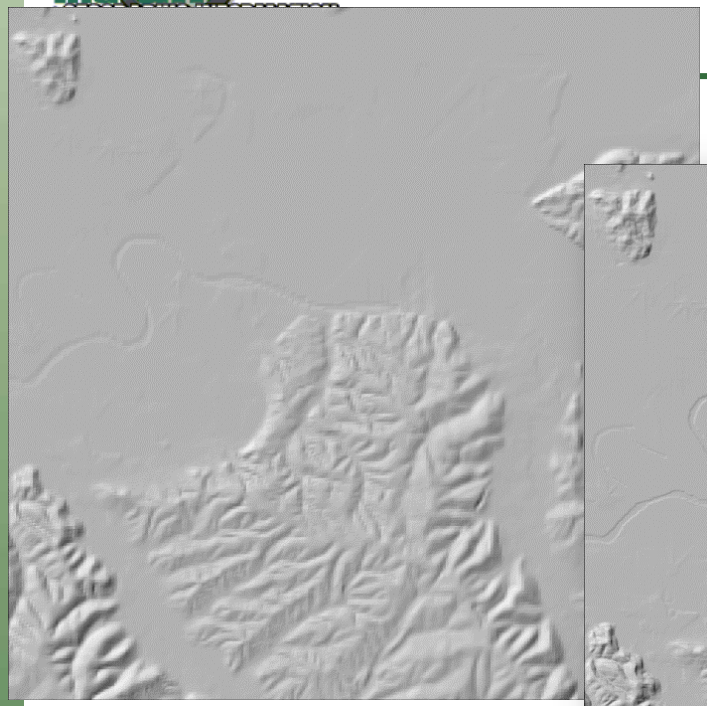


LiDAR Hillshade from 2011 -2013 Program

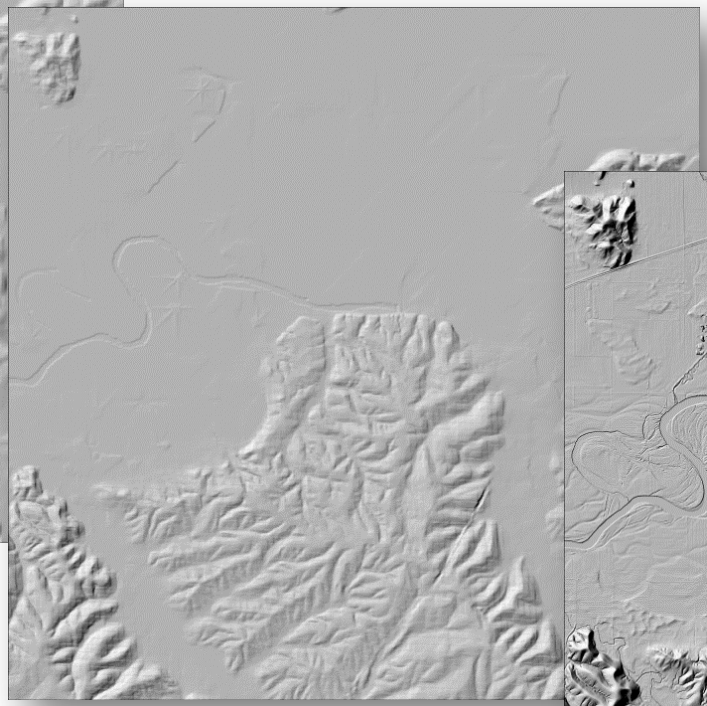
http://bit.ly/1gokPKH

LiDAR

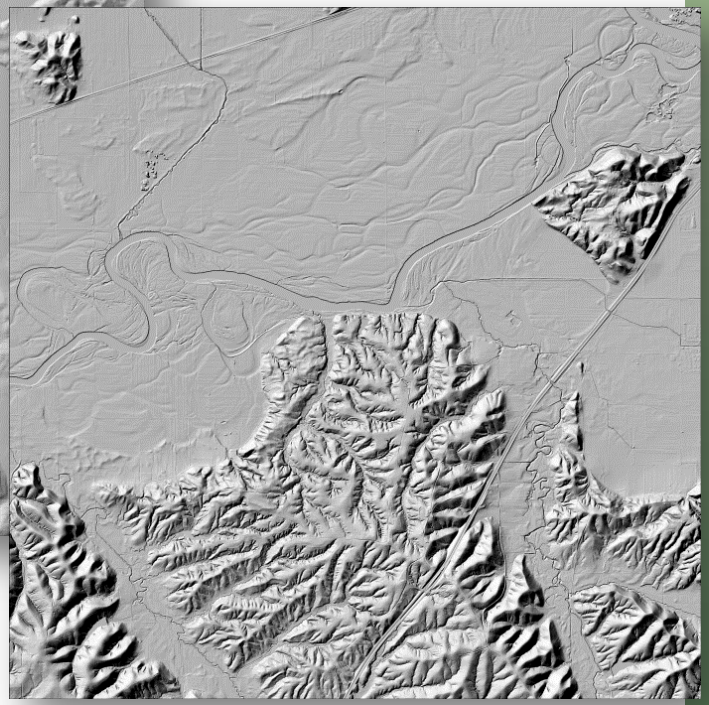
Improvements in resolution



30 m DEM



10 m DEM



1.5 m DEM

SW of Martinsville, Indiana

Slide Courtesy of Todd Thompson @ Indiana Geological Survey

USGS 3D Elevation Program (3DEP)
FY16 Broad Agency Announcement (BAA)
Project Selection In Progress

- 41 proposals submitted for projects in 29 states + 1 territory
- Total project value of $36M; $21M in partner contributions, requesting $15M 3DEP funding
- Coverage proposed 142,000 sq mi
- BAA remains open to new proposals through the year